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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 20441.2-2018

Electroacoustics -- Measurement microphones -- Part 2: Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique

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Foreword

GB/T 20441 "Electrical Acoustic Measurement Microphone" is divided into 8 parts.

--- Part 1. Specification for laboratory standard microphones;

--- Part 2. The primary method of using the reciprocity technology to calibrate the sound pressure of the laboratory standard microphone;

--- Part 3. The primary method of free field calibration of laboratory standard microphones using reciprocity technology;

--- Part 4. Working standard microphone specifications;

--- Part 5. Comparison of sound pressure calibration of working standard microphones;

---Part 6. Electrostatic exciters for determining the frequency response;

--- Part 7. Difference between free field sensitivity and sound pressure sensitivity of laboratory standard microphones;

--- Part 8. Comparison method for determining the free field sensitivity of working standard microphones.

This part is the second part of GB/T 20441.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the translation method equivalent to IEC 61094-2.2009 "Measurement microphones Part 2. Using reciprocity technology for laboratory standards

The original method of sound pressure calibration of quasi-microphones.

This section also made the following editorial changes.

--- In line with the series of national standard names, the title of this section adds "electroacoustics";

--- Because the original text is wrong, the voltage value in 6.2 is changed to "200.0V".

1 Scope

This part of GB/T 20441 specifies the primary method for determining the complex sound pressure sensitivity of the laboratory standard microphone, which is built for sound pressure measurement.

Establish an accurate basis for reproducibility.

This section applies to laboratory standard microphones that meet the requirements of GB/T 20441.1-2010 and other types of electricity of the same size

Rong microphone.

All quantities in this section are expressed in SI units.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 20441.1-2010 Electroacoustic measuring microphones - Part 1. Specification for laboratory standard microphones (IEC 61094-1.

2000, IDT)

ISO /IEC Guide 98-3 Measurement uncertainty - Part 3. Guidance for the expression of

uncertainty in measurement [Uncerntaityof

measurement-Part 3. Guidetotheexpressionofuncertaintyinmeasurement(GUM1995)1)]

3 Terms and definitions

The following terms and definitions as defined in GB/T 20441.1-2010, ISO /IEC Guide 98-3 apply to this document.

3.1

Reciprocal microphone reciprocalmicrophone

A linear passive microphone with equal amplitudes of the forward and reverse transfer impedances of the open circuit.

3.2

The phase angle of the sound pressure sensitivity of the microphone phaseangleofpressuresensitivityofmicrophone

The phase angle between the open circuit voltage of the microphone at a given frequency and the sound pressure uniformly applied to the diaphragm.

Note. The phase angle is expressed in degrees or radians [(°) or rad].

3.3

Electrical transfer impedance electricaltransferimpedance

For two acoustically coupled microphone systems, the open circuit voltage used as the receiving microphone and the electrical input input for the microphone used as the transmitter

The ratio of the flow.

Note 1. The electrical transfer impedance is expressed in ohms (ohm).

Note 2. This definition only applies to the grounded shield structure given in 7.2 of GB/T 20441.1-2010.

1) ISO /IEC Guide 98-3.2008 is a reprint of the.1995 Guide to Expression of Uncertainty in Measurement.

3.4

Acoustic transfer impedance acoustictransferimpedance

For two acoustically coupled microphone systems, the sound pressure acting on the receiving microphone diaphragm and the shortness produced by the microphone used for the emission

The quotient of the road volume speed.

Note. The acoustic transfer impedance is expressed in pascals per cubic meter (Pa.s/m3).

3.5

Coupled cavity coupler

The acoustic coupling unit between the microphones, after the microphone is installed, forms a cavity that is predictable in shape and size.

4 Reference environmental conditions

The reference environmental conditions are.

---Air temperature. 23.0 ° C;

--- Static pressure. 101.325kPa;

--- Relative humidity. 50%.

5.1.1 Overview

The reciprocal calibration of the microphone can be done with three microphones, two of which should be reciprocal microphones, or one auxiliary source and two

The microphones are completed and one of them should be reciprocal.

Note. Non-reciprocal microphones can only be used as acoustic receivers.

5.1.2 Overview of the principle of the three-microphone method

The two microphones are acoustically coupled with a coupling cavity, one as a sound source and the other as an acoustic receiver, measuring its electrical transfer impedance.

When the acoustic transfer impedance of the system is known, the sound pressure sensitivity product of the two coupled microphones can be determined. Microphone (1), microphone

(2), the microphone (3) paired two pairs, can get three independent products, can derive the sound pressure sensitivity expression of each microphone.

5.1.3 Overview of the principle of two microphones and an auxiliary sound source method

First, the two microphones are acoustically coupled with the coupling cavity to determine the sound pressure sensitivity product of the two microphones, see 5.1.2. Then,

The sound source radiates the same sound pressure to the two microphones, and the ratio of the output voltage is equal to the sound pressure sensitivity ratio. According to the spirit